

# Enterprise Content Management for the Engineering Sector

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Enhancing Core Business Processes

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## ► INTRODUCTION

This document reviews the state of the Enterprise Content Management (ECM) market from the perspective of the specialized needs of organizations with all or part of their focus on engineering. We have taken input from recent surveys undertaken by Datamonitor as well as the extensive supporting research undertaken by a series of Butler Group analysts.

## ► THE ROLE OF CONTENT AND COLLABORATION IN BUSINESS PROCESSES

Business processes are seldom performed in isolation but involve collaboration between individuals and groups that create and use shared information. Not surprisingly this has resulted in the inclusion of collaboration functionality in Enterprise Content Management (ECM) solutions, ranging from document review features supported by simple linear workflows, check-out and -in facilities, and version control, to full-blown collaboration products within some of the larger ECM platforms incorporating shared workspaces, Instant Messaging (IM), and even the ability to create and manage blogs.

For many organizations e-mail started as the tool of choice for simple collaboration but organizations that handle large volumes of unstructured information have now implemented ECM solutions to manage documents, and other types of mainly unstructured information. This has resulted in the deployment of centralized repositories for the storage and sharing of information, and has enabled organizations to put formal processes in place to manage the lifecycle of items of information including documents, which can be managed by workflow.

This has necessitated the introduction of more formal collaboration steps within the document lifecycle, which can again be controlled and managed via workflow including the review steps, which can all be monitored as part of the ECM solution to ensure that each stage is performed within a prescribed timescale. This extension into the area of Document Management (DM) and Records Management (RM) is also driven partly by the fact that many Enterprise Resource Planning (ERP) systems do not have sufficient functionality in this respect and that for compliance reasons there is a value in holding all the information relating to the lifecycle of documents in a single repository. As documents are created they are immediately categorized to enable future retrieval through search capabilities.

At one end of the collaboration scale is a simple document going through a create, edit, review, and publish process, which can be managed by a very simple, linear workflow. At the other end of the scale is a compound document such as a set of engineering design documents with creation and amendments being managed within a formal project environment. This requires more complex workflow, and most ECM vendors now provide a full Business Process Management (BPM) capability to enable organizations to create complex processes that include bringing together information from a variety of different repositories.

When dealing with more complex compound documents such as those found in the engineering industry, there is a need to manage the content throughout its lifetime that might involve collaboration between many people and organizations, through multiple versions and reviews, requiring more sophisticated workflow processes. These processes may require much tighter controls on the access and update rights of collaborators and need to manage collaboration throughout an extended enterprise involving multiple groups inside and outside the organization.

## ► ENTERPRISE CONTENT MANAGEMENT AND THE ENGINEERING MARKET

Let us consider the specific needs for ECM solutions that support the engineering and construction industries.

### Pre-Built Support for Standard Engineering Processes and Project Management

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An ECM solution serving the engineering industry needs to support the standard practices and processes that are an everyday part of that domain. This will involve support for Project and Programme Management. These capabilities are often not part of a major vendor's core functionality and would need to be built on the foundation of a standard ECM solution.

Typical of the areas that would need to be covered are:

- Assisting in the construction of responses to Requests For Information (RFI) in the tendering process.
- Transmittal Management for document review and approval throughout the extended network of partners, suppliers and sub-contractors.
- Project Document Control.
- Contract Management.
- Full support for complex structures of engineering and CAD documents.
- Full auditability of information throughout the content lifecycle.
- Comprehensive monitoring and analysis of processes.

### Business Process Management

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The ECM solution must have the ability to integrate content management processes with other related applications, with workflow processes that take account of the roles, responsibilities, and authorities of those involved. The BPM support must be easily extendable to enable the linking to asset management, ERP, and financial systems as required and support the development and optimization of the business processes.

### Full Lifecycle Support

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Documents as well as assets in an engineering environment are often complex hierarchical structures, the components of which are of significant value. There is a critical need to maintain the link between documents and assets throughout all the phases of the lifecycle. This involves the design, engineering and construction phases and continues into the operational and maintenance phases and eventual retirement or disposal of the assets and supporting documentation. There is a further need to initiate and track the associated actions that affect them, retaining multiple versions of documents and the assets' history. This adds emphasis to the requirements of the ECM solution for this industry in the areas of Document Management (DM), Records Management (RM), and integration with Asset Management, as well as highlighting the need for sophisticated workflow processes.

The first step of an RM process is to declare a record from information which has been created, captured, scanned, or entered. It then has a retention period set, is indexed and categorized, has disposal schedules set against it, and also permissions which normally involves setting it to "read only". It will typically utilize workflow as the declaration process is often automated. It may be archived, either as soon as it is declared as a record, or as it ages. At the end of the retention period it may be reviewed as part of the disposition schedule. At this stage it could be retained for a further period, destroyed, or transferred to a permanent archive. During its retention period it may need to be retrieved using a search and discovery process, and if it is requested by a regulator it will need to be copied onto the appropriate medium. Every step in the lifecycle of the record will be fully audited.

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## Security and Compliance

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Checking permissions and authentication of access rights are further complications because of the need for careful governance of the assets concerned. All actions must be tracked and auditable, and easily queried and reported upon to meet both statutory requirements as well as operational needs. Maintaining such information, and managing the information in a widely distributed environment that may involve multiple partners in a large-scale project, is not trivial. A solution that offers full lifecycle support both within and outside the firewall and enables secure information sharing and collaboration is a requirement that is particularly important in an engineering solution.

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## Analytical and Monitoring Capabilities

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The ECM repository is typically used to bring together information from other applications, rather than to create information. Therefore one of the most important features is the ability to import information from other applications, or save them into the repository. Indexing and categorization of the information is vital if search and retrieval is required. The use of standard templates may also be required if information needs to be re-purposed in order to be published to requestors via a Web site. Digital Asset Management may also be a necessity if images are part of the information to be stored. The information may need to be presented in a report format, so the ability to produce reports may be a major requirement. In an engineering environment the Business Intelligence (BI) and analytic capability will also need to enable review of the status of various processes by key staff.

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## Distributed and Multilingual Capabilities

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Engineering companies are now highly internationalized with various functions being either outsourced offshore or undertaken by the company's staff located around the world. This applies not only to complex projects and programmes involving multiple partners located globally but also to individual projects where core skills are rare or localized. The need for multi-language support is thus a key requirement in an engineering environment.

## ► THE VALUE OF CONTENT APPLICATIONS

Organizations with content-centric processes are now utilizing a new breed of content applications to better meet their specific business requirements, with powerful results. Examples are both vertical-specific and horizontal, and include areas such as contract management and drawings management in the engineering industry, the processing of claims and applications in financial services, and the creation of product documentation in manufacturing.

All of these applications have some common characteristics: there is much closer integration of content, not only into the business process, but also with enterprise applications that handle structured information; the content and its container can be updated and reconfigured as part of the process; collaborative working allows multiple parties to interact with the information; and business rules and policies can be associated with the content and used to amend the behavior of the application. The foundation for these solutions is a content platform that provides a range of content services, which can then be assembled into a process-centric application.

Platforms such as IBM's FileNet, Microsoft's SharePoint Server 2007 and other leading Digital Rights Management (DRM) and ECM solutions, including EMC Documentum, offer an extensive range of generic ECM functionality that is applicable to a wide range of horizontal markets. However if each organization or site is required to build its own additional functionality or tailor these horizontal environments to their particular needs, then there are a number of consequences. First of all is the time and effort involved, which can be considerable because of the specialized vertical industry knowledge that needs to be incorporated into such a solution. Secondly is the potential problems caused by creating multiple solutions based on the same horizontal platform that have incompatible structures and processes.

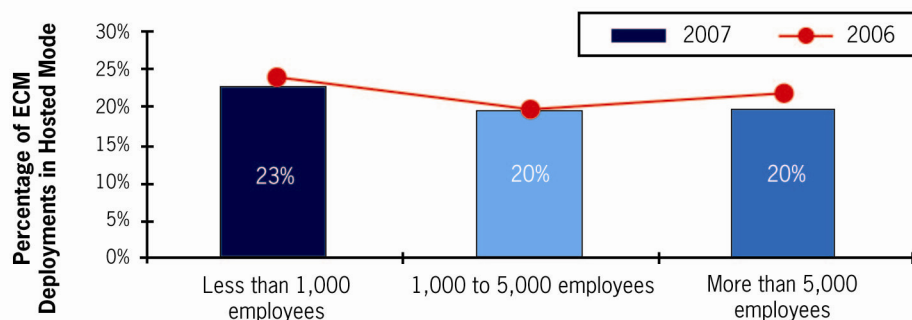
There is a great deal of benefit in using a solution that has been built by a specialized Independent Software Vendor (ISV) that has strong industry experience. Such a vendor is able to create a solution that covers the major areas of specialization in a market and incorporates best practice into that solution. Such implementations can be pre-populated with the generic content most likely to be of value to companies in that vertical, and these 'content applications' then accelerate the implementation delivering benefits earlier with an increase in business value.

## ► DEPLOYMENT CHOICES

### Hosted and In-House Solutions

An analysis of data from a series of Datamonitor's Technology Trends surveys in 2007 suggests that enterprises of all sizes are unable to adopt the hosted model when limitations in the solutions of the major vendors prove restricting. The trend is more pronounced at the extremes - large enterprises (more than 5,000 employees) and small enterprises (less than 1,000 employees) recorded a 2% decrease in hosted content management deployments, while medium enterprises (between 1,000 and 5,000 employees) recorded a sub 1% decrease.

Datamonitor believes that hosted deployments in the content management space are close to saturation point, especially as enterprises increasingly prefer to house both their content repositories and management solutions inside the firewall to mitigate security and compliance risks. The rising importance of content-centric collaboration is also driving enterprises away from the hosted model, with companies looking to harness sprawling amounts of information available internally. This trend could reverse if the limitations regarding the secure management of distributed information could be removed. In an ideal world of course, the client would be offered the choice of a hosted or in-house implementation reflecting the level of control they require over the implementation.



*Figure 1: Enterprises across the size bands are moving away from hosted solutions, albeit very slowly  
(Source: Technology Trends survey of 1,300 enterprises 2006-2007)*

### Outsourcing

An analysis of data from a series of Datamonitor's Technology Trends surveys reveals that content management outsourcing has steadily increased across most regions, with 19% of enterprises outsourcing content management solutions in 2007 compared to 16% in 2006. Spain, a notable exception in this trend, recorded a staggering 38% of outsourced deployments in 2006 compared to 32% in 2007. Overall, Spain and Italy emerge as clear leaders in content management outsourcing. Over the next two years, the UK is expected to grow the fastest in terms of outsourcing deployments, while France and Germany are set to remain the slowest.

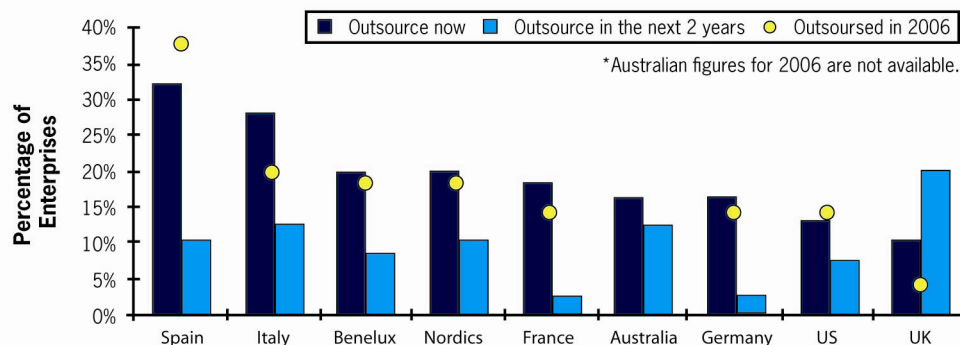


Figure 2: Outsourcing is expected to gain further ground across most regional markets, notably in the UK (Source: Technology Trends survey of 1,300 enterprises 2006-2007)

## SaaS

Modern architectures based on Service Oriented Architecture (SOA) are enabling the flexible provision of Software as a Service (SaaS) deployment models: the value to an organization being the reduced up-front license costs, and payment that reflects usage levels. Such models will be particularly useful for vertical applications where the lifetime and extent of the implementation is variable. For example for shorter lived projects or for use by an extended network of collaborators, some of which will have low volume usage but for whom the enforcement of compliant processes and best practice is important. Successful implementations of this model require that there is an effective mechanism for securing the shared data and authenticating the roles and access rights of users.

In many ways SaaS offers many of the benefits of a hosted solution but without the drawbacks of setting up and maintaining hosted solutions. Butler Group sees SaaS as appropriate for many large companies looking at working with partners, suppliers, and sub-contractors on engineering and construction projects. The in-house system may not be an option for them as it would mean that they would need to give all the external parties access to the solution within their firewall. They could host a solution outside the firewall but it is clearly much better to look at SaaS, where you just buy the service for the number of users you need for each specific phase of the project.

## Extending not interfacing with ECM solutions

When discussing vertical 'content applications' we concluded that there was significant value in adopting a specialized solution provided by a domain expert. There is even more benefit if such a vendor develops solutions offering multiple platform and deployment options. Creating platform-specific solutions that interface with various ECM platforms is certainly an option but one that fails to take full advantage of future functionality of the platforms' architecture and core features. It is far better to extend the core functionality of the main platform so that the solution offered is compatible with the core functionality and takes automatic advantage of improvements with new releases of that platform.

In an ideal world the extended capabilities offered by the vertical content application vendor should be interoperable between multiple major ECM platforms. The solution should be 'back-end agnostic' in that the enhanced functionality is built on a series of industry leading ECM platforms, with the client choosing the implementation they prefer.

Whether implemented as an in-house solution, hosted internally or externally, or whether provision is outsourced, it will be the case that many organizations will already license solutions for ECM from multiple suppliers. There is much to be gained if the suppliers are able to offer their functionality as extensions to multiple vendors' solutions and to provide interoperability between these. It significantly increases the flexibility of the adopting company and allows it to make better use of its licensed services without being tied to a particular platform supplier.

## ► THE EVOLUTION OF THE ECM MARKET

The ECM market has undergone a massive degree of consolidation, with, in the last two years, IBM acquiring FileNet, Oracle gaining Stellent, EMC acquiring Documentum and Open Text taking over Hummingbird. In recent months the consolidation has continued but now we are seeing extensions and add-ons to existing major solutions. On the one hand the acquisitions extend the companies vertical market capabilities and on the other it extends their functionality.

We can divide the major vendors up into three main groups: those that concentrate on the platform and functionality, those that are more content-centric and those that deliver more vertically aligned solutions.

Type	Example Companies	Approx. Market Share
Infrastructure Platforms	IBM FileNet, EMC, Oracle, Microsoft	49%
Content-centric Suites	Open Text, Vignette, Interwoven	28%
Vertical-focused or Point Solutions	Hyland, SDL Tridion, Symantec Sword CTSpace	23%

There is now very little to choose between the core capabilities of the major ECM platforms, with differentiators coming from the solutions that the vendors or their partners have created that sit on top of the platforms. This can create confusion for customers when choosing the best platform to suit their requirements, but can also make it difficult for the vendors to sell the advantages of their platforms – the vendors are therefore attempting to create differentiators by extending their capabilities through acquisition. However, there is a danger in this strategy because the size and complexity of some of these platforms may deter potential customers from selecting them, even though many of the additional features are available as optional modules.

These recent purchases demonstrate that the trend for acquisition amongst ECM vendors is alive and well. For organizations that prefer to use a one-stop-shop approach to software this is a favorable trend and is making software acquisition easier. However, there is a risk that some of these platforms will become too expensive, too complex, and too difficult for organizations to implement and manage, with many features that they will never require, and this will be of benefit to smaller vendors that have only core ECM features. We expect the major ECM platforms to evolve into larger Information Management infrastructures that incorporate different product areas, including storage and security, which will serve mainly larger enterprises, and this will create new markets for the smaller vendors in some of the areas previously occupied by larger, established providers. It also leaves a fertile ground for the ISVs to provide vertical solutions based on these main ECM platforms.

## ► SELECTING A CONTENT APPLICATION PROVIDER

If one is starting out to choose an appropriate company that can provide the functionality needed to rapidly address the specific needs of a vertical market space such as engineering then there are a number of specific issues that are particular to that market, such as the industry knowledge and experience of the vendor. Clearly if we are looking at a content application supporting best practices and offering pre-built process support then the greater the experience the supplier has in that market and the more focused they are on it the better.



A further consideration will be the deployment options that they offer. Do they provide integration and interoperability between multiple underlying ECM platforms and will they offer the required mix of hosting, outsourcing and SaaS options? In a heterogeneous environment involving multiple suppliers and technologies the degree of flexibility offered could be crucial to a successful take-up and successful implementation of the solution.

This leads on to a further but important point regarding internationalization and global support. Clearly it is possible to support solutions at a distance, using the SaaS model for example. But local laws and best practices differ and solutions need also to be supported in multiple languages. We know that “right-shoring” and the appropriate degree of localized support are great advantages to the successful implementation of internationally distributed solutions. This is true whether there are multiple implementations of the solution or a single implementation supporting a global project. Thus, looking for a supplier with genuine local support in multiple countries may well be a further critical issue.

Clearly the relationship that a content application provider specializing in a particular market has with the suppliers of its underlying platforms is also of particular interest. A strong set of industry partnerships and agreements to promote the solution in particular markets are good signs that the vendor is stable and has the respect of the marketplace.

Finally there is the obvious issue of financial stability. If one is committing one's company to an ECM solution of any kind, one needs to be assured that the company providing the solution has both a track record of growth and funding of development as well as the financial backing and stability to stay the course.

## ► SWORD CTSPACE

### Product Description

The Sword CTSpace solution set provides solutions that cover the general horizontal requirements of those seeking to collaborate securely in complex engineering and construction environments with a variety of deployment models and based on alternative platforms. There are also more targeted solutions aimed at specific vertical opportunities, but still offering platform-agnostic implementations. Sword also differentiates by providing Multilanguage support and an extensive global network of offices and technical staff to assist with global implementations.

### Sword Collaboration Workspace

Sword Collaboration Workspace is a solution specifically designed to take advantage of the SaaS model providing a secure collaborative workspace to support Web-based, on-demand project management systems. This offers collaboration capabilities for complex, large-scale, enterprise-wide projects (and will be known as Fusion SaaS when re-launched during 2009).

The solutions offer the following functionality:

- A secure, central document repository workspace.
- Version control with easy access to current and previous versions of documents.
- Customizable document numbering to allocate a unique reference number for individual documents.
- Document categorization to allow documents to be allocated to specific categories, with a unique meta-data and numbering system.
- Document registration to create a placeholder for documents which have yet to be uploaded to the system.
- Easy-to-use functionality for adding new users.
- User profile management to determine which individuals or groups can read or update files.
- An integrated viewer enabling users to view and mark-up documents in over 250 file formats without the requirement for the native applications.



- A full audit function to track and report on all activity.
- A complete search function with the ability to store searches for future use.

## Sword Fusion

Sword offers full ECM Solutions incorporating extensive Document and Project Management capabilities that extend leading ECM platforms offering platform-agnostic implementations of this functionality. Fusion is a Web-based application specifically designed to manage engineering documentation in the context of a construction project, or operating plant, or facility. Fusion runs as an application layer on top of a company's Enterprise Content Management (ECM) system, or alternatively can be run as a stand-alone application. The Fusion functionality is now the focus of Sword CTSpace offerings.

The Fusion functionality includes the following core capabilities:

- Project Document Control.
- Change Management.
- Design, document review, and issue.
- Transfer to client.
- Project Correspondence.
- Requests for Information (RFI) support.
- Bid RFP Packages.
- Vendor Document review.

## The Fusion Solution Set

Sword Fusion is available in three forms and these are described below:

### Fusion for IBM FileNet P8

Fusion for IBM FileNet P8 is an application built directly on the IBM FileNet platform. It takes advantage of the workflow, version control, and records management provided by that platform to provide the business process management capabilities required to support complex engineering environments. All users share a common secure repository.

The solution has at its heart the IBM FileNet platform upon which are built the process development framework, compliance management, content lifecycle management, and business intelligence that support the business processes offered to the client.

### Fusion Share

Offers the Fusion functionality on the Microsoft SharePoint Platform, and also takes advantage of the services that SharePoint enables. Since Fusion Share extends SharePoint, all the normal SharePoint Functionality is still available enabling a user to start new SharePoint discussions or join existing discussions that are linked to specific folders, categories, or documents. A user can also create or view SharePoint List items: Contacts, Events, Announcements, Tasks, and Issues.

### Fusion Standalone

Sword also offers a traditional product supporting the Fusion functionality that interfaces with ECM systems which is still available for those organizations who have made a corporate commitment to a single ECM vendor and for which the platform agnosticism and alternative deployment options are not seen to be of value. This is clearly a less strategic solution for Sword but is still available if required.

## Sword Paragon

Sword Paragon is a solution specifically targeted at providing cost management functionality for projects or a programme of projects. The solution extends the core Fusion functionality and provides specific cost management processes aimed at this vertical market.

## Product Deployment Options

Sword offers these solutions in a variety of deployment models: either as a SaaS solution, a hosted or outsourced implementation, or installed and managed in-house. Sword thus offers all the forms of deployment that a company might require. For those who wish to retain full control over the installations there is the option to take an in-house licensed version of the solution. For those wishing to have the solution hosted, this can be undertaken in-house or outsourced.

Sword sees particular benefits in the use of the SaaS model because all parties involved in a project can quickly get up and running without the need to install hosted systems. In this marketplace SaaS is ideal for projects where suppliers, partners and sub-contractors need to collaborate together to create, review, and approve documentation during the project design and construct phases. A major advantage being that the SaaS solution is outside of any company's firewall so removing one of the main barriers to external collaboration.

Security is a key consideration and a strength of Sword's SaaS solution which is provided through secure data centers both in the UK and the US. Setting up such a facility with the necessary 24-hour performance monitoring tools would be a major challenge for the hosted approach. Some of Sword's clients use a hybrid approach managing the internal project documents on their internal ECM system while using a SaaS ECM solution to collaborate and share documents with external parties. They can then pass documents between both environments during the project and at the end download all the project documents to their in-house ECM system.

Whether the deployment is managed in-house or provided as a SaaS option, Sword CTSpace's use of a Web-based interface makes implementation and adoption much faster and easier to manage than client-based solutions. This should certainly be the preferred interface option for solutions that are widely distributed amongst multiple, changing partners.

## Market Strategy

### Solution

Sword is not trying to cover the widest possible ECM market but has focused its vertical industry knowledge into the delivery of solutions that offer genuine business process management in critical areas of the engineering and construction markets.

The Fusion solution takes full advantage of the underlying ECM platform and adds valuable business process support and extended analysis capabilities. Butler Group believes that delivering best practice enshrined within vertically focused solutions will make Sword's CTSpace solution appealing to its intended market, enabling them to gain advantage and implement more quickly.

The agnostic platform approach and alternative deployment methods give the adaptability required by major corporations without the vendor lock-in that can limit future choices.

### Company

Sword is a stable and profitable public company with a growth record that is an exception in the current market. Sword had revenues of \$280M, EBIT \$44M and 28% growth in 2008. In 2009 it expects revenues to reach \$600 Million. This level of sustained growth and profitability should enable potential customers to engage with Sword with a high degree of security and confidence.

The company also has 700 specialist staff located at 21 international office facilities supporting projects in 36 countries. It has six hosting and data recovery centers and offers comprehensive global support. This level of support together with the specialization in the targeted verticals were some of the key requirements we suggested should be considered when choosing a vendor for an ECM solution in this market, and Sword fulfils these criteria.

## Go-to-Market Positioning

Sword has positioned itself as an ally to the major ECM vendors, potentially offering a wide range of solutions that extend all the major ECM vendors' offerings. The active support being offered by IBM shows that they value the additional capabilities that Sword are bringing to the market. By delivering solutions that are interoperable between different platforms and offering a wide range of deployment options, Sword is neither restricting nor tying in potential customers to any specific technology, and Butler Group believes this is a sensible approach. By enabling clients to have multiple ECM solutions, Sword is protecting the investment already made by global organizations that may have different platforms in different geographies, and enabling secure collaboration between them.

Sword, already one of the world's largest vertical ECM vendors/integrators is well placed to extend its share of the ECM market in the Engineering and Construction space, due to a combination of its strong vertical focus and platform transparency, delivered by a stable company with global reach.

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